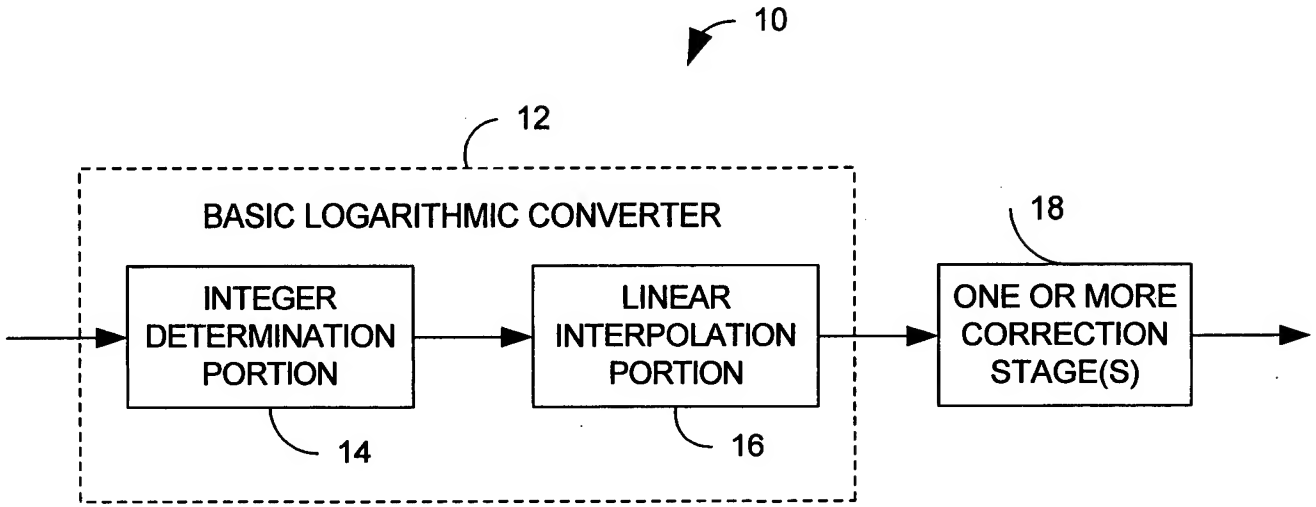
10
12
BASIC LOGARITHMIC CONVERTER
INTEGER DETERMINATION PORTION
LINEAR INTERPOLATION PORTION
18
ONE OR MORE CORRECTION STAGE(S)
14
16

FIG.1

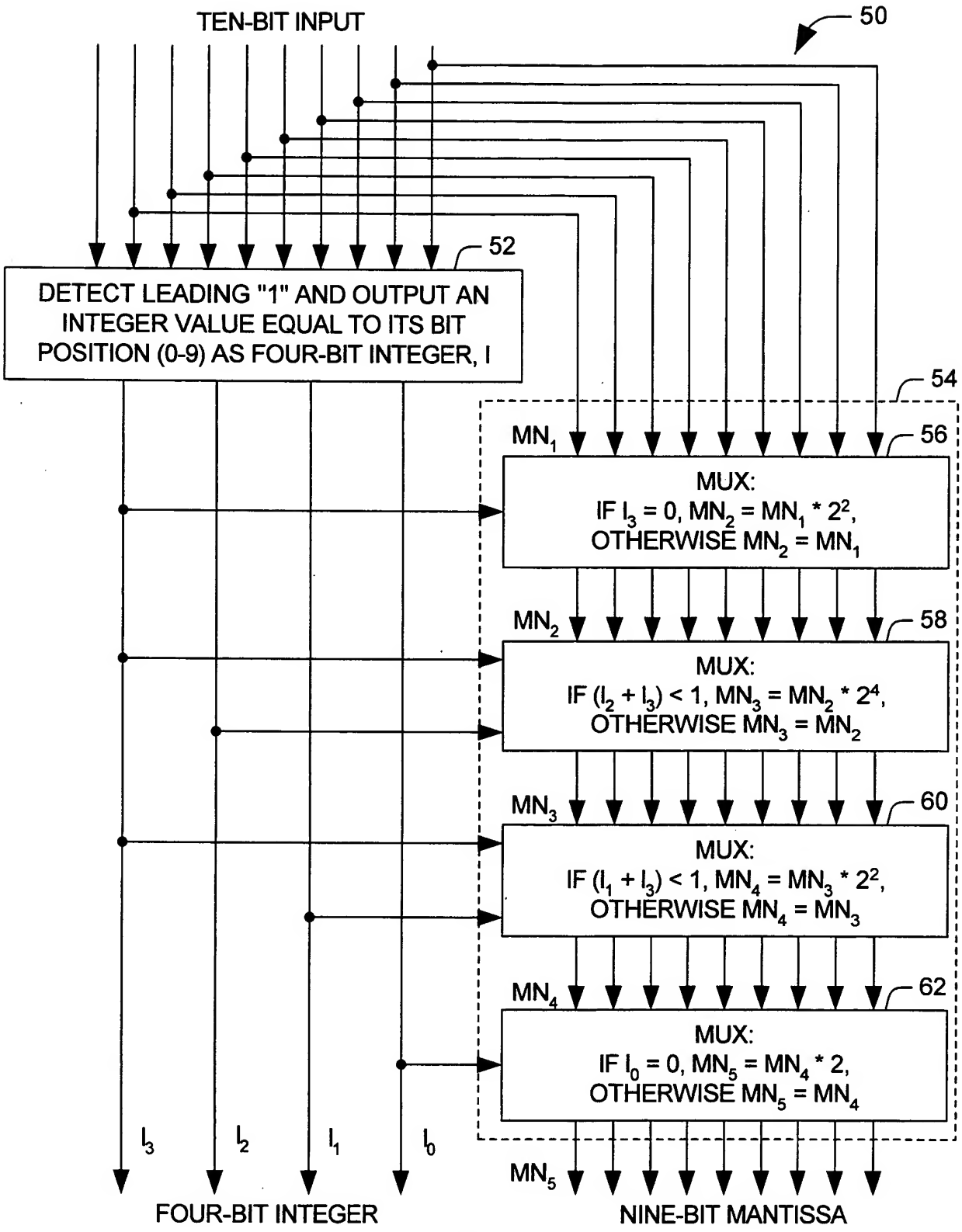
TEN-BIT INPUT
50
52
DETECT LEADING "1" AND OUTPUT AN INTEGER VALUE EQUAL TO ITS BIT POSITION (0-9) AS FOUR-BIT INTEGER, I
54
MN1
56
MUX:
IF I3 = 0, MN2 = MN1 * 2^2,
OTHERWISE MN2 = MN1
MN2
58
MUX:
IF (I2 + I3) < 1, MN3 = MN2 * 2^4,
OTHERWISE MN3 = MN2
MN3
60
MUX:
IF (I1 + I3) < 1, MN4 = MN3 * 2^2,
OTHERWISE MN4 = MN3
MN4
62
MUX:
IF I0 = 0, MN5 = MN4 * 2,
OTHERWISE MN5 = MN4
I3
I2
I1
I0
MN5
FOUR-BIT INTEGER
NINE-BIT MANTISSA

FIG. 2

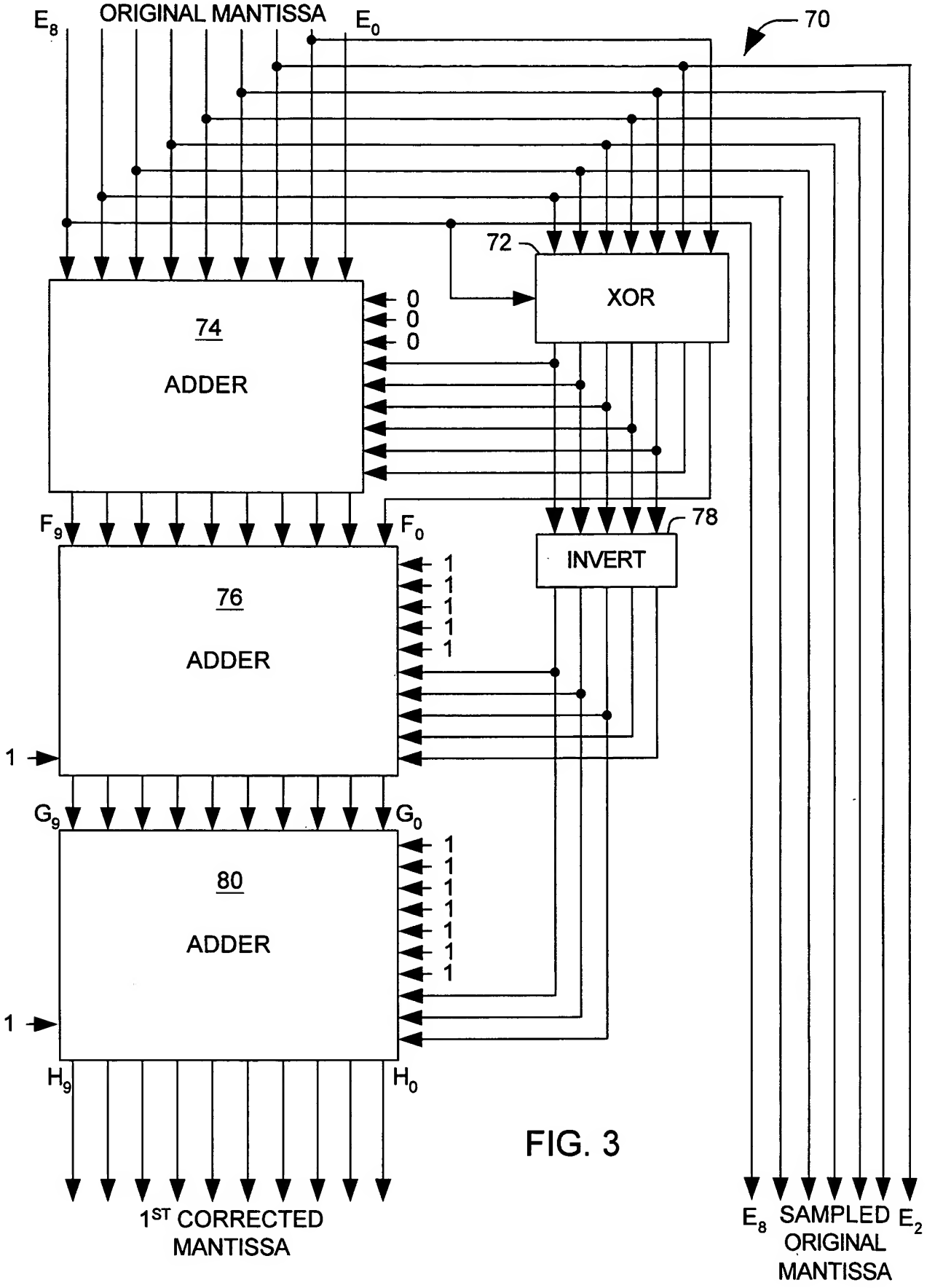
E8
ORIGINAL MANTISSA
E0
70
72
XOR
74
ADDER
0
0
0
F9
F0
78
INVERT
76
ADDER
1
1
1
1
1
1
G9
G0
80
ADDER
1
1
1
1
1
1
1
1
H9
H0
1ST CORRECTED MANTISSA
E8 SAMPLED ORIGINAL MANTISSA E2

FIG. 3

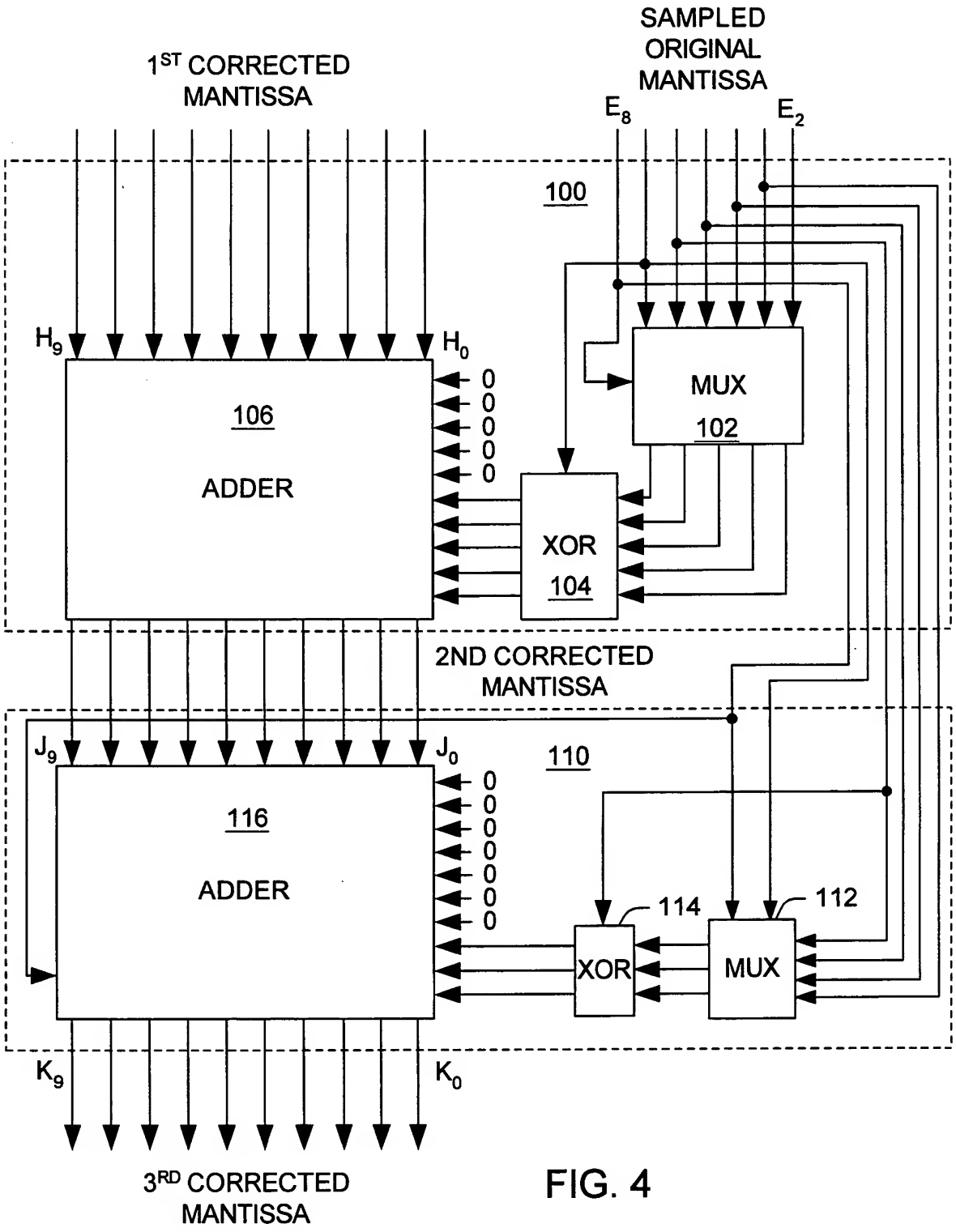
1ST CORRECTED MANTISSA
SAMPLED ORIGINAL MANTISSA
E8
E2
100
H9
H0
106
ADDER
0
0
0
0
0
MUX
102
XOR
104
2ND CORRECTED MANTISSA
J9
J0
110
116
ADDER
0
0
0
0
0
0
0
114
112
XOR
MUX
K9
K0
3RD CORRECTED MANTISSA

FIG. 4

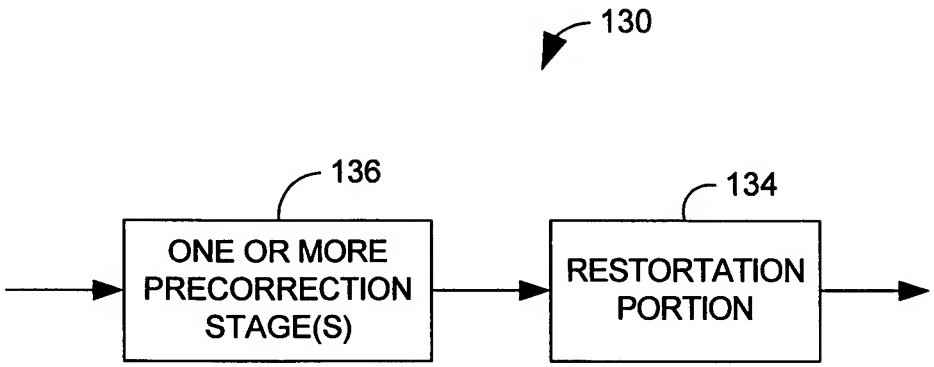
130
136
134
ONE OR MORE PRECORRECTION STAGE(S)
RESTORTATION PORTION

FIG.5

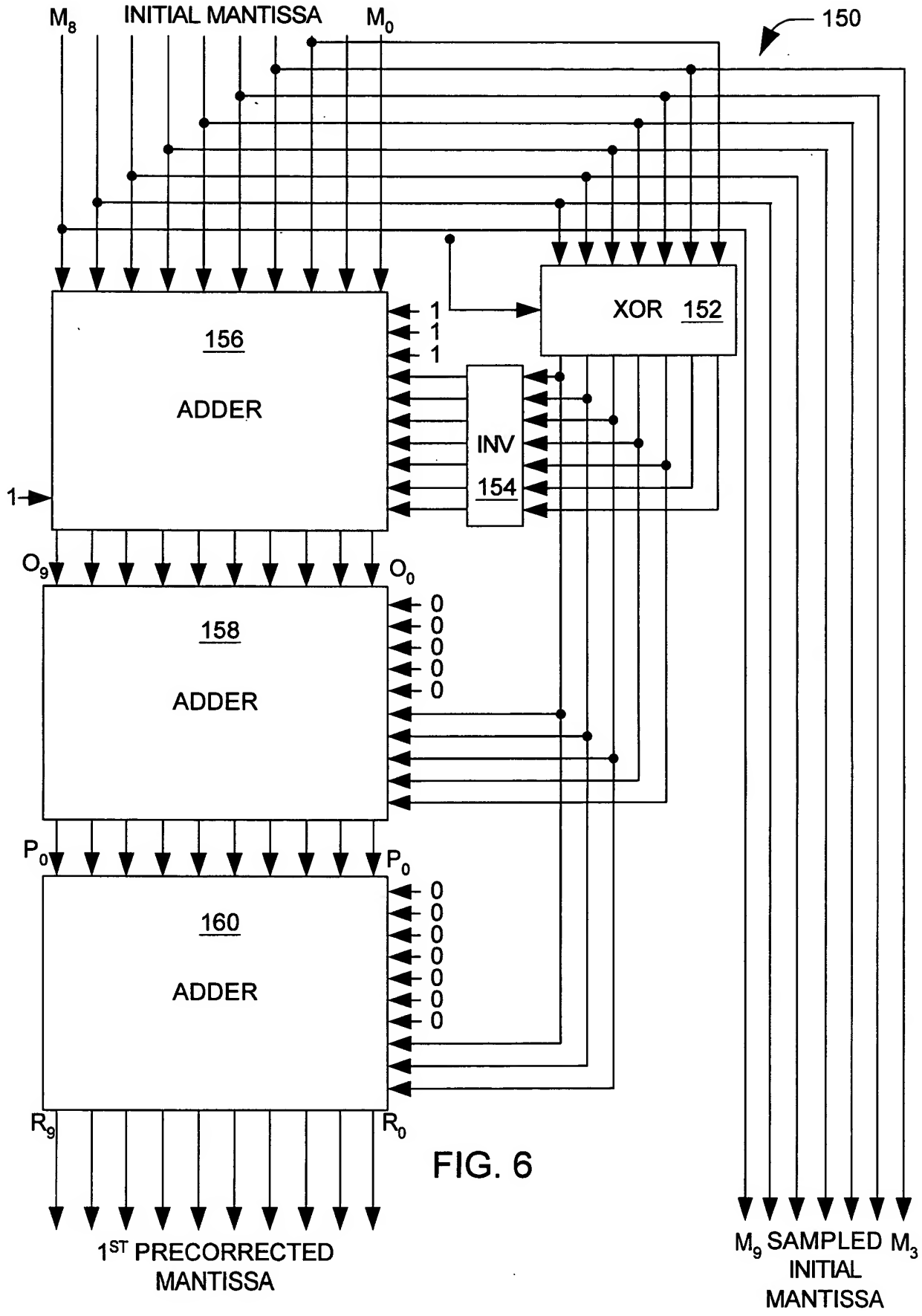
M8
INITIAL MANTISSA
M0
150
XOR 152
156
ADDER
1
1
1
INV
154
1
O9
O0
158
ADDER
0
0
0
0
0
P0
P0
160
ADDER
0
0
0
0
0
0
0
R9
R0
1ST PRECORRECTED MANTISSA
M9 SAMPLED INITIAL MANTISSA M3

FIG. 6

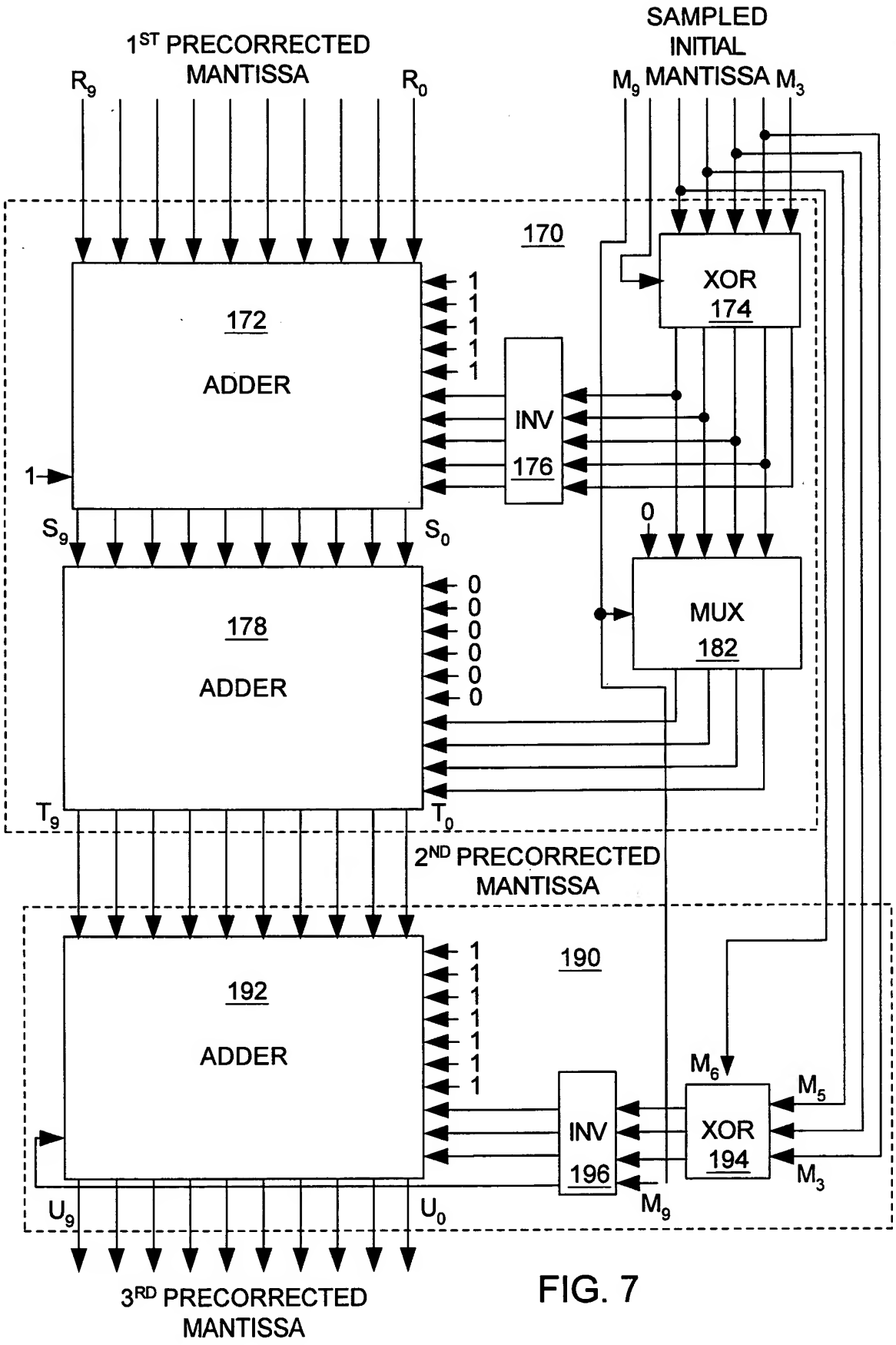
1ST PRECORRECTED MANTISSA
R9
R0
SAMPLED INITIAL MANTISSA
M9
M3
170
172
ADDER
1
1
1
1
1
XOR
174
INV
176
1
S9
S0
0
178
ADDER
0
0
0
0
0
0
MUX
182
T9
T0
2ND PRECORRECTED MANTISSA
190
192
ADDER
1
1
1
1
1
1
1
M6
M5
INV
196
XOR
194
M3
M9
U9
U0
3RD PRECORRECTED MANTISSA

FIG. 7

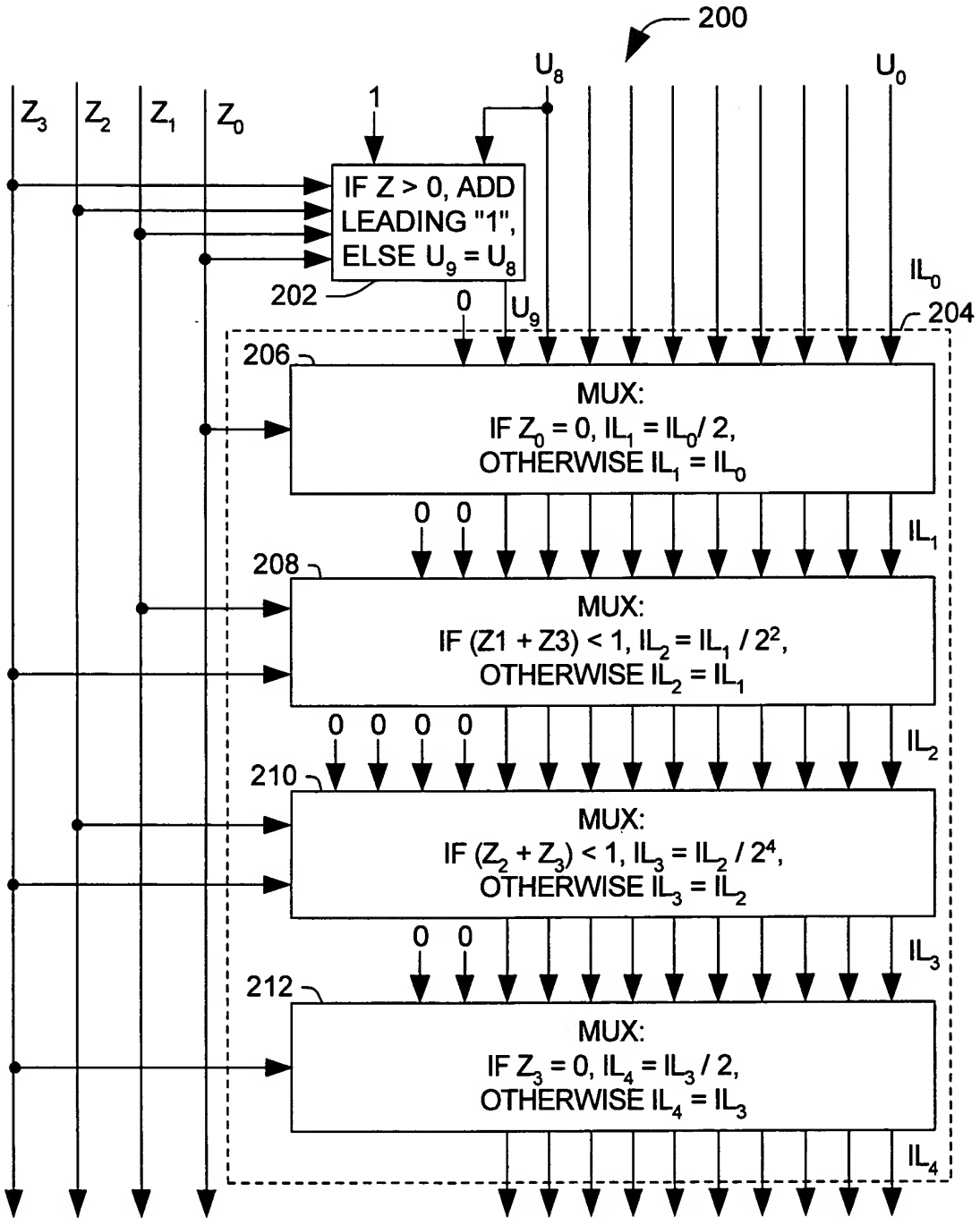
200
U_8
U_0
Z_3
Z_2
Z_1
Z_0
1
IF Z > 0, ADD LEADING "1", ELSE $U_9 = U_8$
202
0
U_9
IL_0
204
206
MUX:
IF $Z_0 = 0$, $IL_1 = IL_0 / 2$,
OTHERWISE $IL_1 = IL_0$
0 0
IL_1
208
MUX:
IF $(Z1 + Z3) < 1$, $IL_2 = IL_1 / 2^2$,
OTHERWISE $IL_2 = IL_1$
0 0 0 0
IL_2
210
MUX:
IF $(Z_2 + Z_3) < 1$, $IL_3 = IL_2 / 2^4$,
OTHERWISE $IL_3 = IL_2$
0 0
IL_3
212
MUX:
IF $Z_3 = 0$, $IL_4 = IL_3 / 2$,
OTHERWISE $IL_4 = IL_3$
IL_4

FIG. 8

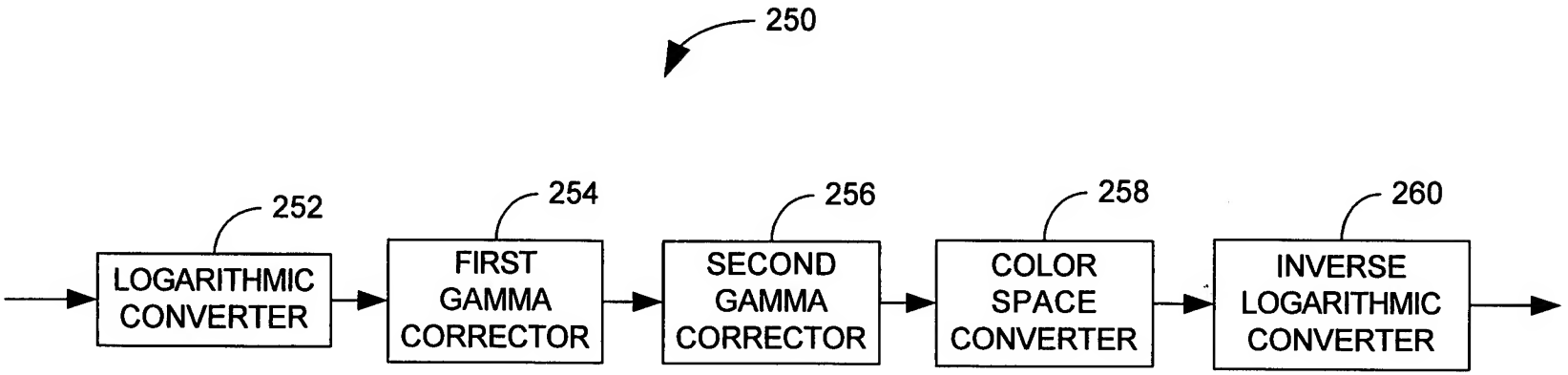
250
252
LOGARITHMIC CONVERTER
254
FIRST GAMMA CORRECTOR
256
SECOND GAMMA CORRECTOR
258
COLOR SPACE CONVERTER
260
INVERSE LOGARITHMIC CONVERTER

FIG. 9

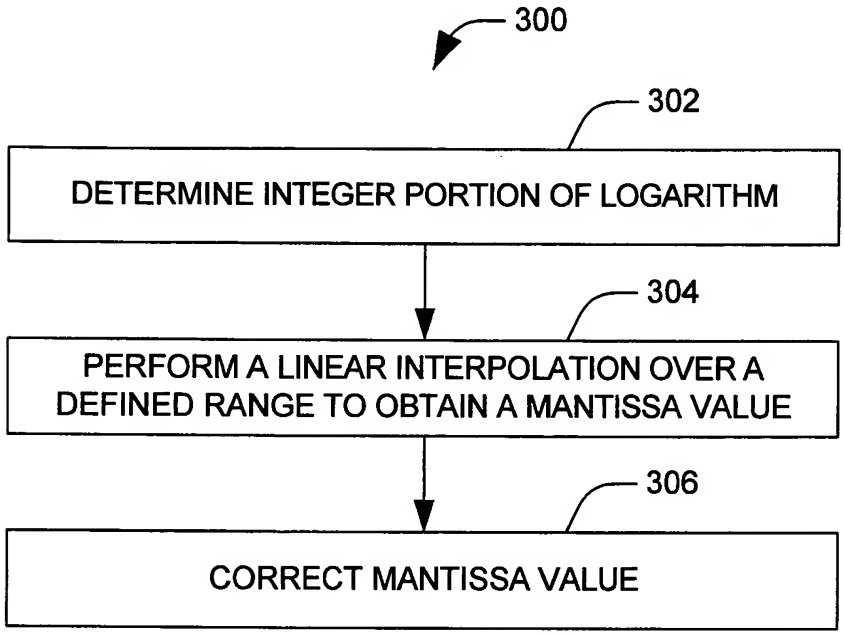
300
302
DETERMINE INTEGER PORTION OF LOGARITHM
304
PERFORM A LINEAR INTERPOLATION OVER A DEFINED RANGE TO OBTAIN A MANTISSA VALUE
306
CORRECT MANTISSA VALUE

FIG. 10

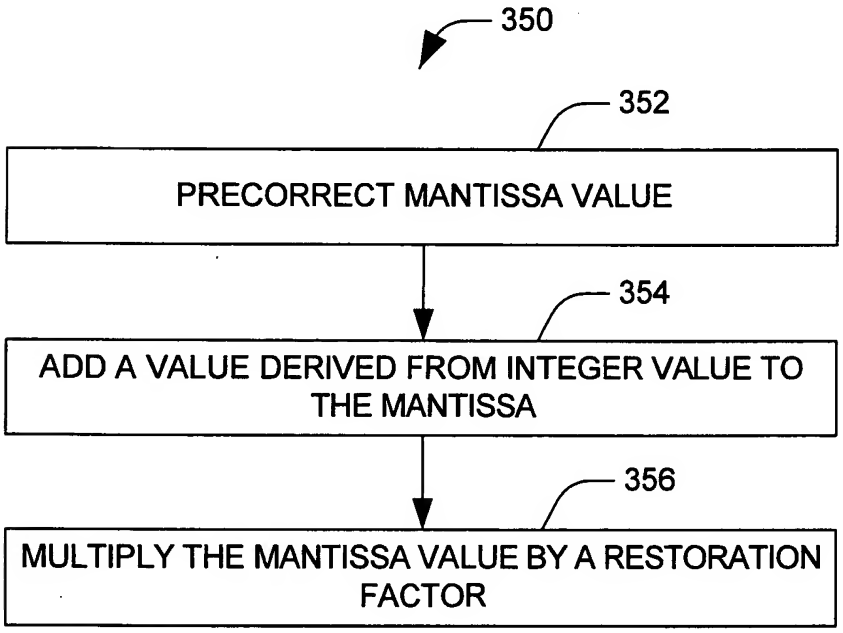
350
352
PRECORRECT MANTISSA VALUE
354
ADD A VALUE DERIVED FROM INTEGER VALUE TO THE MANTISSA
356
MULTIPLY THE MANTISSA VALUE BY A RESTORATION FACTOR

FIG. 11